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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/591,522

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Yoshio Hirano

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22852

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12/22/2009

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EXAMINER

PALMER, TIFFANY

ART UNIT

PAPER NUMBER

4172

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DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/591,522	<b>Applicant(s)</b> HIRANO ET AL.	
	<b>Examiner</b> TIFFANY PALMER	<b>Art Unit</b> 4172	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |                                                                                                                                   |                                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)                                               | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>9/1/2006</u> . | 6) <input type="checkbox"/> Other: ____.                                                |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1-3, 5-8, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kenji et al (Japanese Patent Application Publication Number 2000-024454, already of record) in view of Meratla (US Patent Number 5,467,722).

4. Regarding Claim 1, Kenji et al teach a method of removing moisture and toxic gas components from exhaust gas, characterized by a process of making exhaust gas, exhausted from an LNG burning boiler (10 Figure 1), flow through coolant (refrigerant 32) contained in a dehydrating tower (bubbling tub 31) to cool it to such a temperature as to solidify moisture (ice) but not carbon dioxide (paragraph [0027]), thereby solidifying moisture (ice) contained in the exhaust gas to separate from the exhaust gas (paragraph [0027]);

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a process of introducing the solidified moisture (ice) into a solid-liquid separator (separation means 34) thereby separating the moisture from the coolant (refrigerant 32, paragraph [0027]); and

a process of making the coolant be contained in a cooling tower (cooling means) so as to be cooled, and then making the coolant (refrigerant 32) be contained in the dehydrating tower (bubbling tub) again so as to be circulated.

5. Kenji et al do not teach nitrogen oxide being removed from the exhaust (combustion) gas through cooling means.

6. In an analogous art of pollutant removal from liquefied natural gas, Meratla teaches nitrogen oxide being removed from the exhaust (combustion) gas (Col 4, lines 48-54) for the benefit of removing pollutants from the gas.

7. It would have been obvious to one of ordinary skill in the art at the time of invention to combine Meratla's nitrogen oxide removal step to Kenji's system and process for the benefit of removing pollutants from the gas.

8. Regarding Claim 2, Kenji et al teach introducing the moisture separated from the coolant into a separation tower (separating means 34) and raising in temperature (heating means) the moisture thereby liquefying the moisture (water, paragraph [0027]).

9. Kenji et al do not teach nitrogen oxide being removed from the exhaust (combustion) gas through cooling means.

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10. In an analogous art of pollutant removal from liquefied natural gas, Meratla teaches nitrogen oxide being removed from the exhaust (combustion) gas (Col 4, lines 48-54) for the benefit of removing pollutants from the gas.

11. It would have been obvious to one of ordinary skill in the art at the time of invention to combine Meratla's nitrogen oxide removal step to Kenji's system and process for the benefit of removing pollutants from the gas.

12. Regarding Claim 3, Kenji et al teach a process of introducing the coolant (refrigerant 32) retrieved in the separation tower (separation means) into the cooling tower (cooling means, paragraph [0027]).

13. Regarding Claim 5, Kenji et al teach a process of cooling the coolant by using the heat of vaporization that is produced when LNG is used as gas fuel (paragraph [0020]).

14. Regarding Claim 6, Kenji et al teach an apparatus of making exhaust gas, exhausted from an LNG burning boiler (10), flow through coolant (refrigerant 32) contained in a dehydrating tower (bubbling tub 31) to cool it to such a temperature as to solidify moisture (ice) but not carbon dioxide, thereby solidifying moisture contained in the exhaust gas to separate from the exhaust gas (paragraph [0027]); an apparatus of introducing the solidified moisture into a solid-liquid separator (separating means 34) thereby separating the moisture from the coolant (paragraph [0027]); and an apparatus of making the coolant be contained in a cooling tower so as to be cooled (cooling means), and then making the coolant be contained in the dehydrating tower (bubbling tub 31) again so as to be circulated (paragraph [0027]).

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15. Kenji et al do not teach nitrogen oxide being removed from the exhaust (combustion) gas through cooling means.

16. In an analogous art of pollutant removal from liquefied natural gas, Meratla teaches nitrogen oxide being removed from the exhaust (combustion) gas (Col 4, lines 48-54) for the benefit of removing pollutants from the gas.

17. It would have been obvious to one of ordinary skill in the art at the time of invention to combine Meratla's nitrogen oxide removal step to Kenji's system and process for the benefit of removing pollutants from the gas.

18. Regarding Claim 7, Kenji et al teach an apparatus of introducing the moisture separated from the coolant (refrigerant 32) into a separation tower (separating means 34) and raising in temperature (heating means 33) thereby liquefying the moisture (water, paragraph [0027]).

19. Kenji et al do not teach nitrogen oxide being removed from the exhaust (combustion) gas through cooling means.

20. In an analogous art of pollutant removal from liquefied natural gas, Meratla teaches nitrogen oxide being removed from the exhaust (combustion) gas (Col 4, lines 48-54) for the benefit of removing pollutants from the gas.

21. It would have been obvious to one of ordinary skill in the art at the time of invention to combine Meratla's nitrogen oxide removal step to Kenji's system and process for the benefit of removing pollutants from the gas.

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22. Regarding Claim 8, Kenji et al teach an apparatus of introducing the coolant (refrigerant 32) retrieved in the separation tower (separation means 34) into the cooling tower (cooling means, paragraph [0027]).

23. Regarding Claim 10, Kenji et al teach an apparatus of cooling the coolant by using the heat of vaporization that is produced when LNG is used as gas fuel (paragraph [0021]).

24. Claims 4 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kenji et al (Japanese Patent Application Publication Number 2000-024454, already of record) in view of Meratla (US Patent Number 5,467,722) as applied to claims 1 and 6 above, and further in view of Kearns (US Patent Number 5,220,796).

25. Regarding Claims 4 and 9, the previous art combination does not teach the coolant including any one of dimethyl ether, methanol, ethanol, toluene, and ethyl benzene used for condensing water in the process.

26. In an analogous art of condensation of liquefied inert gases, Kearns teaches the coolant (refrigerant) as toluene (Col 8, lines 28-33, which reads on the claimed group of coolants) for the benefit of condensing water in the process (Col 2, lines 41-53).

27. It would have been obvious to one of ordinary skill in the art at the time of invention to combine Kearns's refrigerant with the previous combination for the benefit of condensing water.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TIFFANY PALMER whose telephone number is

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(571)270-3666. The examiner can normally be reached on Monday-Friday 7:30am-5pm est.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Angela Ortiz can be reached on (571)272-1206. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TNP

***/Angela Ortiz/***

***Supervisory Patent Examiner, Art Unit 4172***